

Effect of Strain Counterstrain Technique (SCS) Combined with Calf Stretching on Pain and Ankle Dorsiflexion among Security Guard Subjects with Plantar Fasciitis

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Abstract: Background: Plantar fasciitis is a common musculoskeletal condition characterized by pain in the plantar aspect of the heel, particularly during the initial steps after a period of rest. It is frequently associated with prolonged standing, repetitive weight-bearing activities, and limited ankle dorsiflexion. Security guards are at increased risk of developing plantar fasciitis due to prolonged standing. Objective: To find out the effect of strain counter strain technique (SCS) combined with calf stretching on pain and ankle dorsiflexion among security guard subjects with plantar fasciitis. Methodology: 30 subjects (30-45 years) with plantar fasciitis underwent a 4 week intervention of strain counter strain technique combined with calf stretching. Baseline evaluation of pain by NPRS and ROM by Universal goniometry were assessed pre and post treatment. Results: The results showed a statistically significant reduction in pain and improvement in ankle dorsiflexion range of motion following the intervention ($p < 0.001$). Conclusion: Strain counter strain technique combined with calf stretching resulted in a significant reduction in pain and improvement in ankle dorsiflexion range of motion among security guard subjects with plantar fasciitis.

Keywords: Plantar fasciitis, Strain Counter strain technique, Calf stretching, NPRS, ROM, Universal goniometry

1. Introduction

Plantar fasciitis is a common musculoskeletal condition and one of the frequent causes of plantar heel pain. The condition may interfere with walking, prolonged standing, and other weight-bearing activities¹. Occupational activities that require prolonged standing and walking may increase repetitive loading on the plantar structures and contribute to the development or persistence of symptoms². The calf muscles, particularly the gastrocnemius and soleus, Tightness of these muscles may contribute to restriction of ankle dorsiflexion and may influence the mechanical loading of the foot during gait³. Calf stretching is commonly incorporated into the management of plantar fasciitis because it aims to improve the flexibility of the gastrocnemius and soleus muscles and increase ankle dorsiflexion⁴. Strain counter strain (SCS) is an indirect manual therapy technique used in the management of musculoskeletal pain and dysfunction⁵. Manual therapy has been investigated as part of the physiotherapy management of plantar heel pain, with

techniques directed towards reducing pain, improving soft-tissue mobility, and restoring functional movement⁶.

2. Materials and Methods

Materials

Pillows, Consent form, Treatment couch, Pen. Paper Stool.

Methods

This study was conducted at SVIMS college of physiotherapy, Tirupathi, over 6 months of period. The participants were selected through purposive sampling method and taken as single group. The study duration was four weeks.

Inclusion Criteria and Exclusion Criteria

Study compromised of both males and females with the age group of 30-45 years of age. Pain intensity ranging >5/10 on NPRS, ROM using Universal goniometer.

Outcome Measures

- **Pain:** NPRS Scale.
- **Ankle dorsiflexion:** Universal Goniometer

Treatment Protocol

Before initiating the treatment, the procedure was explained to all the subjects. Each treatment session consisted of the Strain Counters strain technique followed by active calf stretching. The subject was positioned prone on the treatment couch with the ipsilateral knee flexed to approximately 90°. The therapist stood beside the affected lower limb and palpates the tender point with one thumb while the opposite hand supported the foot. While monitoring the tender point with one thumb, the toes and ankle are plantar flexed, curving around the tender point until symptomatic relief of the tenderness was felt. Position of ease maintained for 90 seconds. 3 repetitions per session, 3 sessions per week for 4 weeks (12 sessions).

Active Calf Stretching: The subject stood facing a wall with both hands placed against the wall for support. The affected leg was positioned behind with the knee extended and heel in contact with the floor, while the unaffected leg was placed in front. The subject was instructed to lean forward by flexing the front knee while keeping the back knee straight until a gentle stretch was felt in the calf muscles of the affected limb. Hold for 30 seconds for 3 repetitions, 3 sessions per week for 4 weeks (12 sessions).

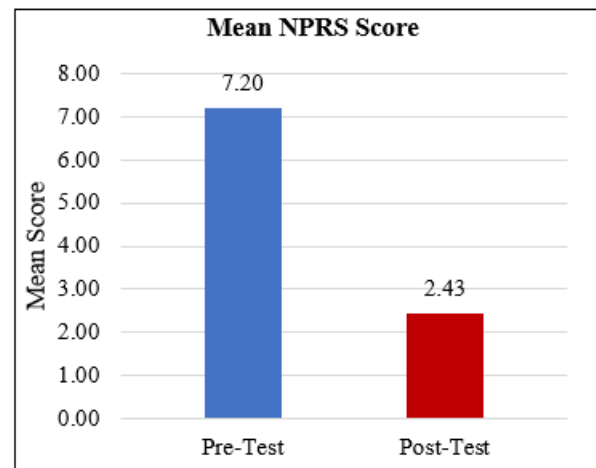
3. Results

The Study demonstrated statistically significant improvement across all outcome measures ($p < 0.001$)

The mean NPRS score decreased from 7.20 ± 0.96 at pre-test to 2.43 ± 0.73 at post-test. The paired t-test showed a statistically significant difference ($t = 31.95$, $p < 0.001$), indicating a significant reduction in pain intensity following the intervention.

Comparison of NPRS scores between pre-test and post-test

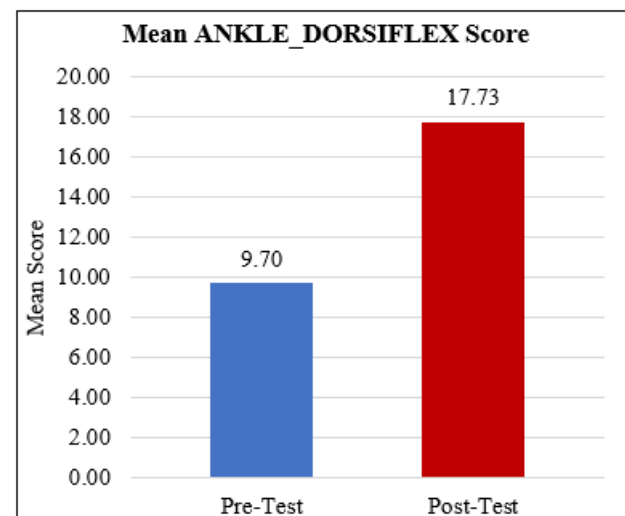
Outcome	Pre-test Mean $\pm$ SD	Post-test Mean $\pm$ SD	t value	p value
NPRS	7.20 ± 0.96	2.43 ± 0.73	31.95	<0.001

**Ankle Dorsiflexion**

A statistically significant improvement in ankle dorsiflexion was observed following the intervention. The mean score increased from 9.70 ± 1.02 at pre-test to 17.73 ± 0.87 at post-test. The paired t-test demonstrated a statistically significant difference ($t = 61.25$, $p < 0.001$), indicating significant improvement in ankle dorsiflexion following the intervention.

Comparison of ankle dorsiflexion between pre-test and post-test

Outcome	Pre-test Mean $\pm$ SD	Post-test Mean $\pm$ SD	t value	p value
Ankle dorsiflexion	9.70 ± 1.02	17.73 ± 0.87	61.25	<0.001

**4. Discussion**

In the present study, the significant reduction in pain may be attributed to the physiological effects of Strain Counter strain (SCS). SCS is an indirect manual therapy technique that positions the affected muscle in a shortened, comfortable position, thereby decreasing muscle spindle activity and reducing abnormal neuromuscular reflexes.

This leads to relaxation of muscle tension, reduction of protective muscle spasm, improved local circulation, and decreased tenderness around the plantar fascia. The reduction in mechanical stress on the plantar fascia contributes to pain relief during standing and walking.

Calf stretching complements the effects of Strain Counter strain by improving the flexibility of the gastrocnemius and soleus muscles. Tight calf muscles are a major contributing factor to limited ankle dorsiflexion and increased plantar fascial strain. Stretching restores muscle extensibility, increases ankle dorsiflexion, decreases tensile loading on the plantar fascia during gait, and improves overall foot biomechanics. Consequently, the combined intervention enhances functional mobility and reduces symptoms associated with plantar fasciitis.

5. Conclusion

The findings of the present study suggest that the Strain Counterstrain technique combined with calf stretching is an effective, safe, and non-invasive physiotherapy intervention for reducing heel pain and improving ankle dorsiflexion among security guard subjects with plantar fasciitis. This intervention can be recommended as part of routine conservative physiotherapy management for individuals with plantar fasciitis, particularly those whose occupation involves prolonged standing.

6. Limitations

- The sample size was relatively small (n = 30).
- The study included only security guard subjects; therefore, the findings cannot be generalized to all populations with plantar fasciitis.
- The duration of intervention was short.

7. Recommendations

Future studies should include a larger sample size. Randomized controlled trials comparing Strain Counterstrain with other manual therapy techniques are recommended. Future studies may include participants from different occupations and age groups to improve the generalizability of the findings.

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